

WE CLAIM:

1. A method for cell activation, the method comprising:
 - (a) introducing a sperm into a mammalian cell;
 - (b) culturing the cell for a time sufficient for cell activation; and
 - (c) removing the sperm from the cell.
2. The method of claim 1, wherein the sperm comprises an intact sperm.
3. The method of claim 1, wherein the sperm comprises a sperm head.
4. The method of claim 1, wherein the sperm comprises a mammalian sperm.
5. The method of claim 4, wherein the mammalian sperm comprises a sperm of a mammal selected from the group consisting of a human, a primate, a bovine, a porcine, an ovine, an equine, a feline, a canine, a caprine, a rabbit, and a rodent.
6. The method of claim 5, wherein the mammalian sperm comprises a human sperm.
7. The method of claim 1, wherein the sperm is heterologous to said mammalian cell to be activated.
8. The method of claim 1, wherein the cell comprises a mammalian cell of a mammal selected from the group consisting of a human, a primate, a bovine, a porcine, an ovine, an equine, a feline, a canine, a caprine, a rabbit, and a rodent.
9. The method of claim 8, wherein the cell comprises a human cell.

10. The method of claim 1, wherein the embryo is selected from the group consisting of a naturally occurring embryo, an embryo produced by in vitro fertilization, a nuclear transfer embryo, and a uniparental embryo.
11. The method of claim 1, wherein the cell has been treated, either before or after introducing the sperm, to remove or inactivate its endogenous nucleus.
12. The method of claim 1, wherein the culturing is performed in vitro or in vivo.
13. The method of claim 12, wherein the culturing is performed in vitro and further comprises incubating the injected cell in a medium containing calcium
14. The method of claim 1, further comprising the step of injecting the cell with one or more agents that enhance divalent cation release in the cell.
15. The method of claim 14, wherein the agent comprises a calcium ionophore, a protein kinase inhibitor, a phosphatase, or a combination thereof.
16. The method of claim 1, wherein the cell comprises an oocyte or an embryo, and further comprising culturing the activated cell to undergo embryonic development.
17. The method of claim 1, wherein the sperm is removed from the cell 15, 30, or 60 minutes following injection.
18. An embryo produced by the method of claim 16, wherein the embryo comprises 1 cell to about 400 cells.
19. The embryo of claim 18, further comprising a blastocyst.
20. A non-human embryo produced by the method of claim 16.

21. The embryo of claim 20, further comprising a blastocyst.
22. The method of claim 16, wherein said embryo is non-human, and further comprising implanting the non-human embryo into a female surrogate.
23. The method of claim 22, wherein said non-human embryo is allowed to develop into a viable, non-human offspring.
24. A non-human offspring produced by the method of claim 23.
25. The method of claim 1, wherein the cell is an oocyte or an embryo, and further comprising induction of persistent calcium oscillations within the oocyte or embryo.
26. An activated mammalian cell produced by the method of claim 1.
27. A method for nuclear transfer cloning comprising:
 - (a) introducing a mammalian donor cell, or a nucleus derived therefrom into a mammalian enucleated oocyte of the same species as the donor cell or donor cell nucleus, to thereby form a nuclear transfer unit; and
 - (b) activating the oocyte, wherein the activating comprises:
 - (i) injecting a sperm into the oocyte;
 - (ii) culturing the oocyte for a time sufficient for activation; and
 - (iii) removing the sperm from the oocyte.
28. The method of claim 27, wherein the activating is performed prior to, simultaneous with, or subsequent to the introducing a mammalian donor cell.
29. The method of claim 27, wherein the sperm is heterologous to the oocyte.
30. The method of claim 27, further comprising culturing the nuclear transfer unit to produce an embryo.

31. An embryo produced by the method of claim 30, wherein the embryo comprises 1 cell to about 400 cells.
32. The embryo of claim 31, further comprising a blastocyst.
33. A non-human embryo produced by the method of claim 30.
34. The embryo of claim 33, further comprising a blastocyst.
35. The method of claim 30, wherein the embryo comprises a non-human embryo, and further comprising implanting the non-human embryo into a female surrogate
36. The method of claim 35, wherein said non-human embryo is allowed to develop into a viable, non-human offspring.
37. The non-human offspring produced by the method of claim 36.
38. The method of claim 27, wherein the sperm is removed from the oocyte 15, 30 or 60 minutes following implantation.
39. A method for nuclear transfer cloning comprising:
 - (a) activating a mammalian oocyte, the activating comprising:
 - (i) injecting a sperm into the oocyte;
 - (ii) culturing the oocyte for a time sufficient for activation; and
 - (iii) removing the sperm from the oocyte;
 - (b) enucleating the oocyte; and
 - (c) introducing into the activated enucleated oocyte a mammalian donor cell, or a nucleus derived therefrom, wherein the donor cell is of the same species as the oocyte, to thereby form a nuclear transfer unit.

40. The method of claim 39, wherein the activating is performed prior to, simultaneous with, or subsequent to the enucleating.

41. The method of claim 39, further comprising culturing the nuclear transfer unit to produce an embryo.

42. An embryo produced by the method of claim 41, wherein the embryo comprises from about 1 cell to about 400 cells.

43. The embryo of claim 42, further comprising a blastocyst.

44. A non-human embryo produced by the method of claim 41.

45. The embryo of claim 44, further comprising a blastocyst.

46. The method of claim 41, wherein the embryo comprises a non-human embryo, and further comprising implanting the non-human embryo into a female surrogate

47. The method of claim 46, wherein said non-human embryo is allowed to develop into a viable, non-human offspring.

48. The non-human offspring produced by the method of claim 47.

49. The method of claim 39, wherein the sperm is removed 15, 30, or 60 following implantation.

50. A method for in vitro fertilization, the method comprising:

(a) contacting a mammalian oocyte with a plurality of sperm, whereby the oocyte is fertilized; and

(b) activating the oocyte, wherein the activating comprises:

(i) injecting a sperm into the oocyte;

- (ii) culturing the oocyte for a time sufficient for activation; and
- (iii) removing the sperm from the oocyte.

51. The method of claim 50, wherein the contacting is performed prior to, simultaneous with, or subsequent to the activating.

52. An embryo produced by the method of claim 50.

53. The method of claim 50, further comprising implanting the embryo into a female surrogate.

54. The method of claim 53, wherein said embryo is allowed to develop into a viable offspring.

55. A non-human offspring produced by the method of claim 54.

56. The method of claim 50, wherein the sperm is removed from the oocyte 15, 30 or 60 min following implantation.

57. The method of claim 16, wherein said embryo is human, and further comprising implanting the human embryo into a female surrogate.

58. The method of claim 22, wherein said human embryo is allowed to develop into a viable human offspring.

59. The method of claim 30, wherein the embryo comprises a human embryo, and further comprising implanting the human embryo into a female surrogate.

60. The method of claim 59, wherein said human embryo is allowed to develop into a viable human offspring.